

P1 1168533

REC'D 17 MAY 2004

WIPO

PCT

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office

May 11, 2004

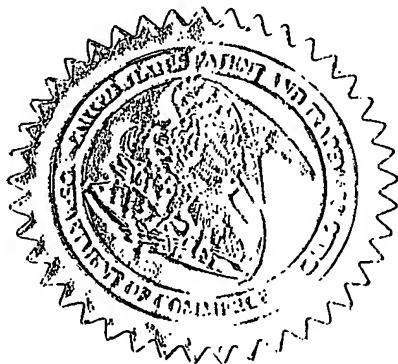
THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.

APPLICATION NUMBER: 60/456,315

FILING DATE: March 20, 2003

RELATED PCT APPLICATION NUMBER: PCT/US04/08870

By Authority of the  
COMMISSIONER OF PATENTS AND TRADEMARKS



*M. Tarver*

M. TARVER  
Certifying Officer

**PRIORITY  
DOCUMENT**

SUBMITTED OR TRANSMITTED IN  
COMPLIANCE WITH RULE 17.1(a) OR (b)

BEST AVAILABLE COPY

03-21-03 0456315-032003  
APPROV  
\$

PROVISIONAL APPLICATION UNDER 37 CFR 1.53(c)  
TRANSMITTAL LETTER

TO THE ASSISTANT COMMISSIONER OF PATENTS  
WASHINGTON, D.C. 20231  
Box Provisional Patent Application

Transmitted herewith for filing is the Provisional Patent application of:

1. Name and Resident Address of Inventors:

- |                                                                                                           |                                                                                                  |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 1. Rangaswamy G. Iyengar<br>576 Sheridan Road<br>Highland Park, IL 60035<br>Country of Citizenship: India | 2. Adam Morrison<br>9621 Ridgeview Road<br>Belvedere, IL 61009<br>Country of Citizenship: U.S.A. |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|

Entitled: **FLUID DISPENSING DEVICE**

Enclosed are: 5 Pages of SPECIFICATION.  
13 Sheets of Drawings (FIGURES 1 - 13)

**Fee Payment Being Made at This Time -Method of Payment of Fees**

A check in the amount of \$ 160.00 is enclosed. Please charge any additional fees or credit overpayment to  
Deposit Account No. 06-0308

Please address all correspondence regarding this application to the undersigned.

Respectfully submitted,

FAY, SHARPE, FAGAN  
MINNICH & McKEE, LLP

20 March 2003  
Date

Timothy E. Nauman  
James W. McKee  
Reg. No. 26,482  
Timothy E. Nauman  
Reg. No. 32,283  
1100 Superior Avenue, 7th Floor  
Cleveland, Ohio 44114-2618  
(216) 861-5581

**CERTIFICATION UNDER 37 CFR 1.10**

I hereby certify that this Provisional Application Transmittal and the documents referred to as enclosed therein are being  
deposited with the United States Postal Service on March 20, 2003 in an envelope as "Express Mail Post Office to addressee"  
Mailing Label Number EV 178758330 US addressed to the Commissioner of Patents and Trademarks, Box-Provisional Patent  
Application Washington, D.C. 20231

Mary M. Schriener  
Mary M. Schriener

TESZ 2 00196 P

**FLUID DISPENSING DEVICE****BACKGROUND OF THE INVENTION**

[0001] This application relates to spray devices that are particularly useful for spraying a fluid from a reservoir. For example, paints, insecticides, garden products, lubricants, etc. are representative of the type of fluid or liquid products that may be selectively sprayed with one of these devices.

5 [0002] Various problems exist with known spraying devices. For example, these devices commonly use a supply of compressed air passed through a venturi, the outlet of which is located adjacent a flow passage in communication with a reservoir of a fluid. The venturi draws the fluid from the reservoir where it is mixed with the compressed air and sprayed on to an associated surface.

10 [0003] The venturi outlet and the flow passage are disposed in fixed relation so that the desired suction and withdrawal of fluid from the reservoir, and introduction of the fluid into the compressed air flow are achieved. Some arrangements add a valve to the arrangement to selectively close the flow passage and thereby control the dispensing of the fluid. However, these arrangements still encounter problems with changeover of the fluid, inoperability at various  
15 angles (e.g. upside down) and the like.

[0004] Another problem is that portability of the spraying device is a concern since the device must be connected to a remote compressor, power source, etc. Multiple lines, for example, extend from the spray device and are connected to a power source (e.g., A.C. source), compressed air supply, and/or fluid reservoir. A need exists for a portable, self-contained  
20 assembly that can be easily manipulated without encountering tangled supply lines or limiting areas of use.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0005] FIGURE 1 is an exploded view of a first embodiment of the invention.

[0006] FIGURE 2 is a longitudinal, cross-sectional view of a second embodiment of the  
25 invention.

[0007] FIGURES 3-13 are various perspective and cross-sectional views of a second embodiment of the invention.

## DETAILED DESCRIPTION OF THE INVENTION

[0008] In one arrangement, a molded, two-part housing is snapped together to provide a convenient hand-held unit that includes all of the components necessary for spraying. For example, as shown in FIGURE 1, housing 20 is illustrated in blue as a two-part housing assembly, the housing halves being essentially mirror images of one another that may be snap-fit or adhesively secured together once the internal components are assembled therein. Thus, housing portions 20a and 20b are brought into mating engagement and define an internal cavity that houses the various components of the hand held sprayer. For example, a power source such as a pack of batteries 22 are provided in a base of the elongated housing. A portable power source is desired in this arrangement so that there is no need for electrical cords during operation. A conventional ON/OFF switch (not shown) selectively connects the power source to a compressor assembly 24 that includes an electric motor 26 that drives an air pump or compressor 28. Specifically, motor 26 is disposed adjacent the power source so that an ON/OFF switch (not shown), selectively energizes the motor to drive the air pump 28. The air pump receives ambient air from the rear of the housing, or up through the base of the handle and around the motor, where the air is pressurized/compressed in the pump and exits through a reduced diameter nozzle or venturi 30. The nozzle is directed outwardly from the housing and passes over a fluid reservoir, such as flexible pouch 32, that stores a fluid to be dispensed on an associated surface.

[0009] Dispensing tip 34 extends from the outlet of the fluid pouch and an outlet thereof is located adjacent the nozzle 30 so that as the pressurized air from the pump passes thereover, the venturi creates a negative pressure or suction to draw the fluid from the pouch 32. Thus, a convenient, hand held, gun-shaped spray device is provided that has its own self-contained compressor, power source, and receives the fluid to be sprayed onto the associated surface.

[0010] Another spray dispenser device is shown in FIGURES 2-13. More particularly, and with specific reference to FIGURES 2-4, housing 40 is adapted for connection to a fluid reservoir 42. Extending outwardly from the housing is a dispensing head 44, which is a generally cylindrical, hollow structure. The dispensing head includes a first end 46 that communicates with the fluid reservoir and has a valve such as ball member 48 received therein. The ball is free to float between a first or upper valve seat 50 and a second or lower valve seat

52. If the ball engages either the first or second seat, then fluid flow from the reservoir is precluded. As shown, flange 54 of the dispensing head cooperates with flange 56 of the housing to secure the dispensing head to the housing in fixed relation.

[0011] Received around the dispensing head is a spray head assembly 60. The spray

5 head assembly includes an elongated, generally cylindrical portion or outer sleeve 62 concentrically received around cylinder portion 44 of the dispensing head. The spray head includes a handle 64 extending outwardly at an upper end thereof to allow for selective depressing movement of the spray head relative to the housing and dispensing head. The spray head further includes a passage 66 that communicates (as represented by dashed line 68) with an  
10 external compressor represented by box 70. For example, the dashed line may be a conventional air line or passage 68 of extended length, e.g., eight to twenty (8-20) feet, extending from a conventional air compressor 70 to provide a flow of pressurized air to passage 66 of the spray device. The compressed air passes through a smaller diameter passage 72 that extends generally perpendicular to the longitudinal axes of the dispensing head and spray head. The air dispensing  
15 opening 72 is provided with a constant supply of pressurized air from the compressor and thus, when air is supplied to line 68, the spray device emits pressurized air. By selectively depressing handle 64, fluid is selectively drawn from the fluid reservoir 42 for mixing with the airflow and spraying or dispensing atomized fluid on to an associated surface as will be described further below.

20 [0012] The dispensing head 44, as noted above is hollow, and includes an internal passage 80 that receives a fluid or liquid head assembly 82. The fluid head assembly is preferably a generally elongated, hollow cylindrical member. Internal passage 84 extends through the fluid head and terminates in a first or bottom opening at one end 86, and a second or upper opening at the other end 88. The fluid head 82 is adapted for sliding movement relative to  
25 the dispensing head and the spray head. The first end 86 selectively engages ball 48 to urge the ball away from the upper seat 50 of the dispensing head. This allows fluid from the reservoir 42 to pass by the lower valve seat, around the ball, and into the passage 84 of the fluid head where the fluid is mixed with the compressed air from air opening 72. Accordingly, it will be

appreciated that when the end 86 of the fluid head engages the ball, the dimensional contours of these engaging components allow fluid to enter the passage 84.

[0013] The relationship of the components of the spray device in Figures 3 and 4 should be contrasted with that in FIGURES 5 and 6. In the latter, the ball is engaged with the lower seat 50 to preclude the passage of any fluid from the reservoir 42. Only compressed air through opening 72 is dispensed from the sprayer. The spray head is located so that its upper end 88 is spaced from or below the air passage 72. This gap or spacing between the end opening 88 and the air opening 72 is sufficient to prevent a sufficient vacuum or suction force to be developed through the liquid head. Thus, the elongated passage 84 of the liquid head does not introduce sufficient vacuum to draw the ball off of the lower seat or draw fluid from the reservoir.

[0014] As shown in FIGURES 5 and 6, the ball is seated. This illustrates that fluid previously removed from the reservoir partially collapses the wall of the reservoir and imparts a backpressure that draws the ball into engagement with the lower seat. This prevents introduction of air into the reservoir when spraying is terminated and, in fact, the wall of the reservoir remains partially collapsed. Such action is desirable since the next time that fluid is to be sprayed, fluid is immediately introduced into the passage 84. Without this feature, air must be removed from the fluid reservoir and impacts on the amount of fluid drawn into the passage, i.e., the fluid and air from the reservoir will both be drawn into the passage 84 rather than just the desired fluid.

[0015] Turning now to FIGURES 7 and 8, pressing down on handle 64 allows cooperating shoulders 90 on the spray head and 92 on the fluid head to selectively engage one another and urge the liquid head downwardly into the passage 80. The depressing action on handle 64 also brings the air opening 72 into alignment with the end 88. Thus, the high pressure airflow passes across the end 88 develops a suction force to draw the fluid contents from reservoir 42 and around the ball 48. The lower end 86 of the stem of the liquid head assures that the ball does not engage the upper seat. Thus, effective spraying is achieved.

[0016] FIGURES 9 and 10 illustrate the sprayer device drawing the fluid contents from the reservoir and mixing the fluid with pressurized air in a spraying operation. The fluid head is positioned so that end 88 is adjacent the air opening 72. The fluid head is not engaging the ball

in this illustration to represent that the ball can be positioned at various locations between the upper and lower valve seats.

[0017] FIGURES 11-13 illustrate three different positions of the ball valve and fluid head (the spray head has been removed for ease of illustration). In FIGURE 11, the ball member is engaged with the seat and the fluid head is shown in a lower position. If the reservoir is compressed or squeezed, the ball moves to the position shown in FIGURES 12 and 13 where it engages the upper valve seat and precludes spilling of the fluid contents from the reservoir. The ball moves upwardly and if the fluid head is in a lower position, the fluid head is also urged to the upper position shown in the figure once the ball engages the lower seat.

[0018] It will be appreciated that the entire spray device can be moved upside down, right side up, or at any angle therebetween, and still effectively spray the fluid contents of reservoir 42. To achieve this, the relative movement between air opening 72 and the opening 88 in the liquid head determines whether or not only compressed air is being dispensed or whether the dispensed air is drawing fluid from the reservoir.

[0019] Still another important feature is that once the handle 64 is released and the air opening 72 separated from opening 88 in the liquid head, no air is drawn into the reservoir. The ball engaging the lower seat achieves this closing action and this occurs, again, irrespective of the orientation of the spray device.

[0020] The invention has been described with reference to the preferred embodiments. Obviously, modifications and alterations will occur to others upon reading and understanding the preceding detailed description. It is intended that the invention be construed as including all such modifications and alterations.

**Inventors:**

1. **Rangaswamy G. Iyengar**  
576 Sheridan Road  
Highland Park, IL 60035  
Country of Citizenship: India

2. **Adam Morrison**  
9621 Ridgeview Road  
Belvedere, IL 61009  
Country of Citizenship: U.S.A.

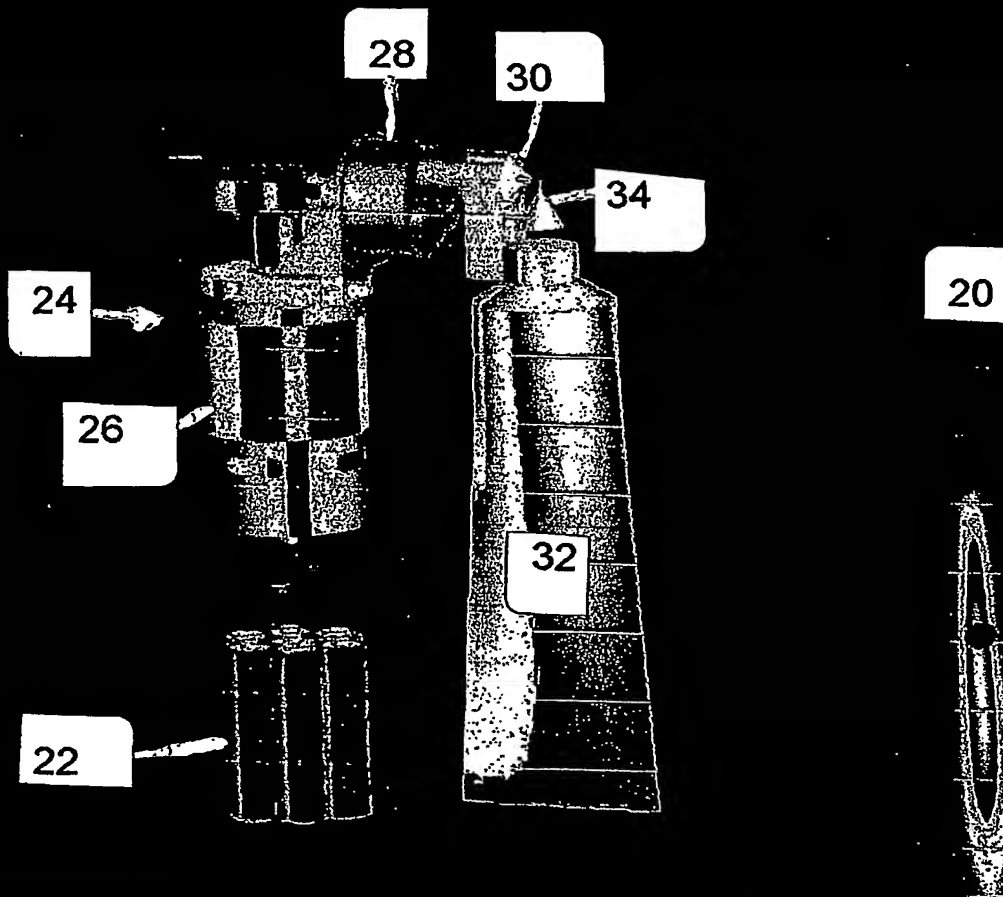
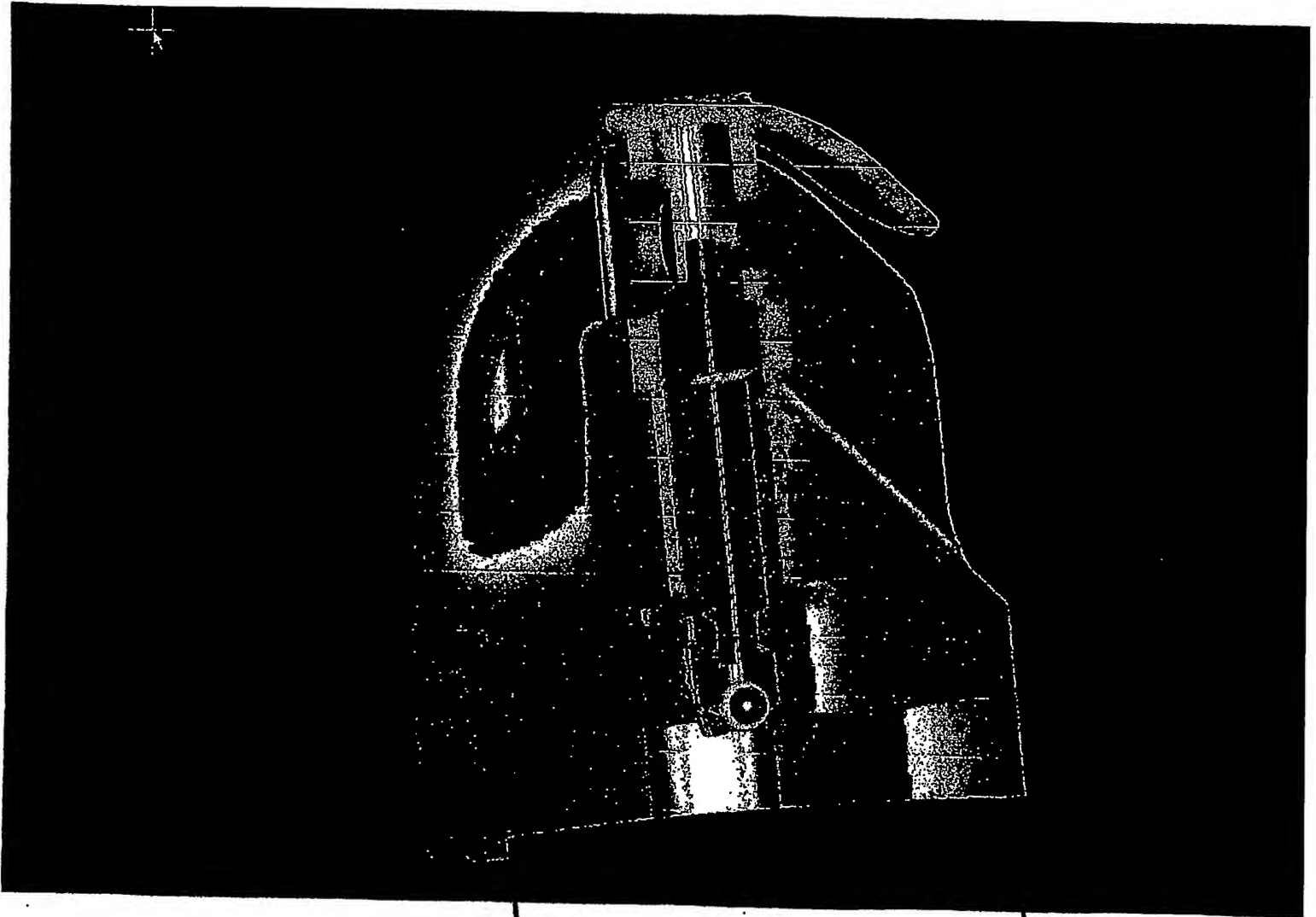


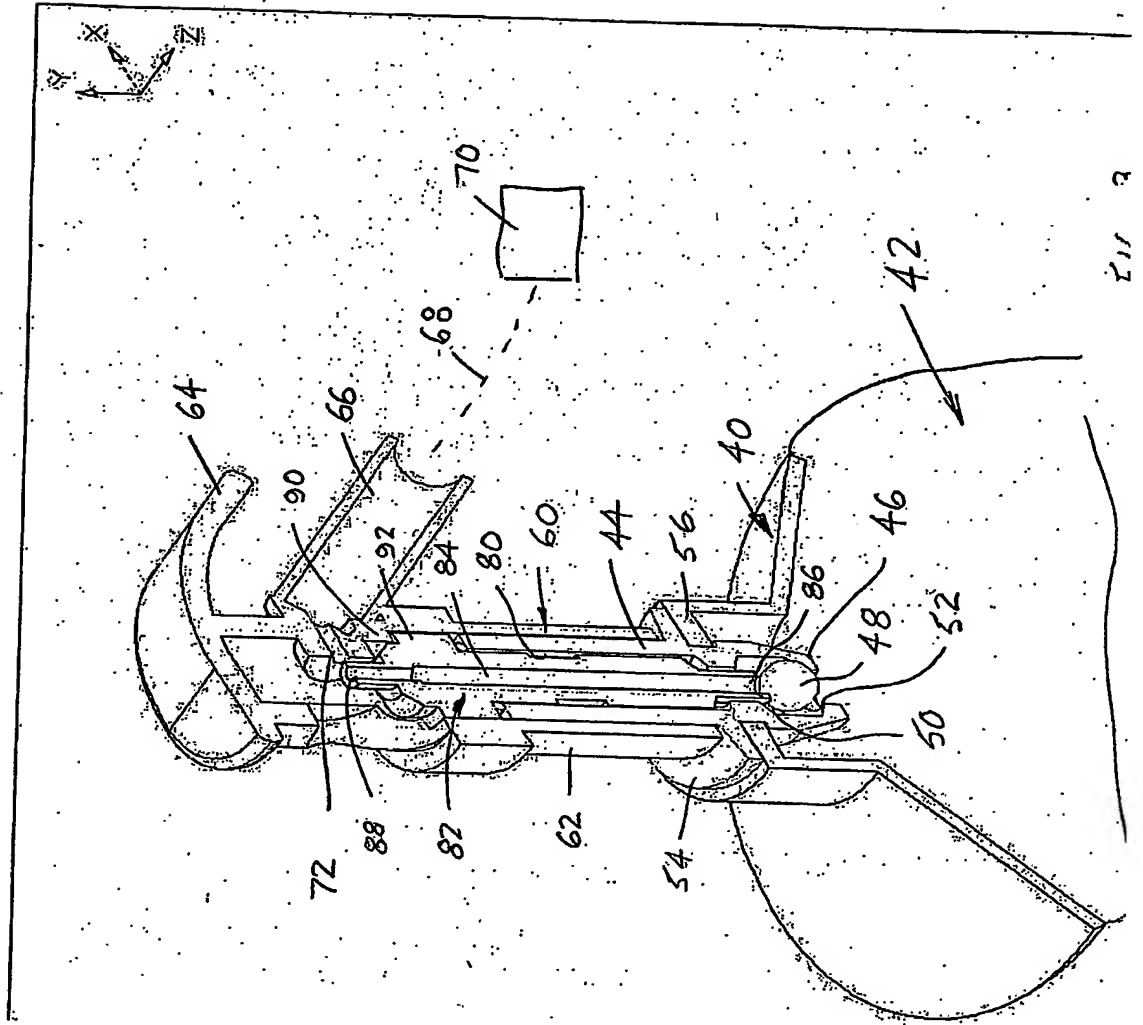
FIG. 1





42

FIG. 2



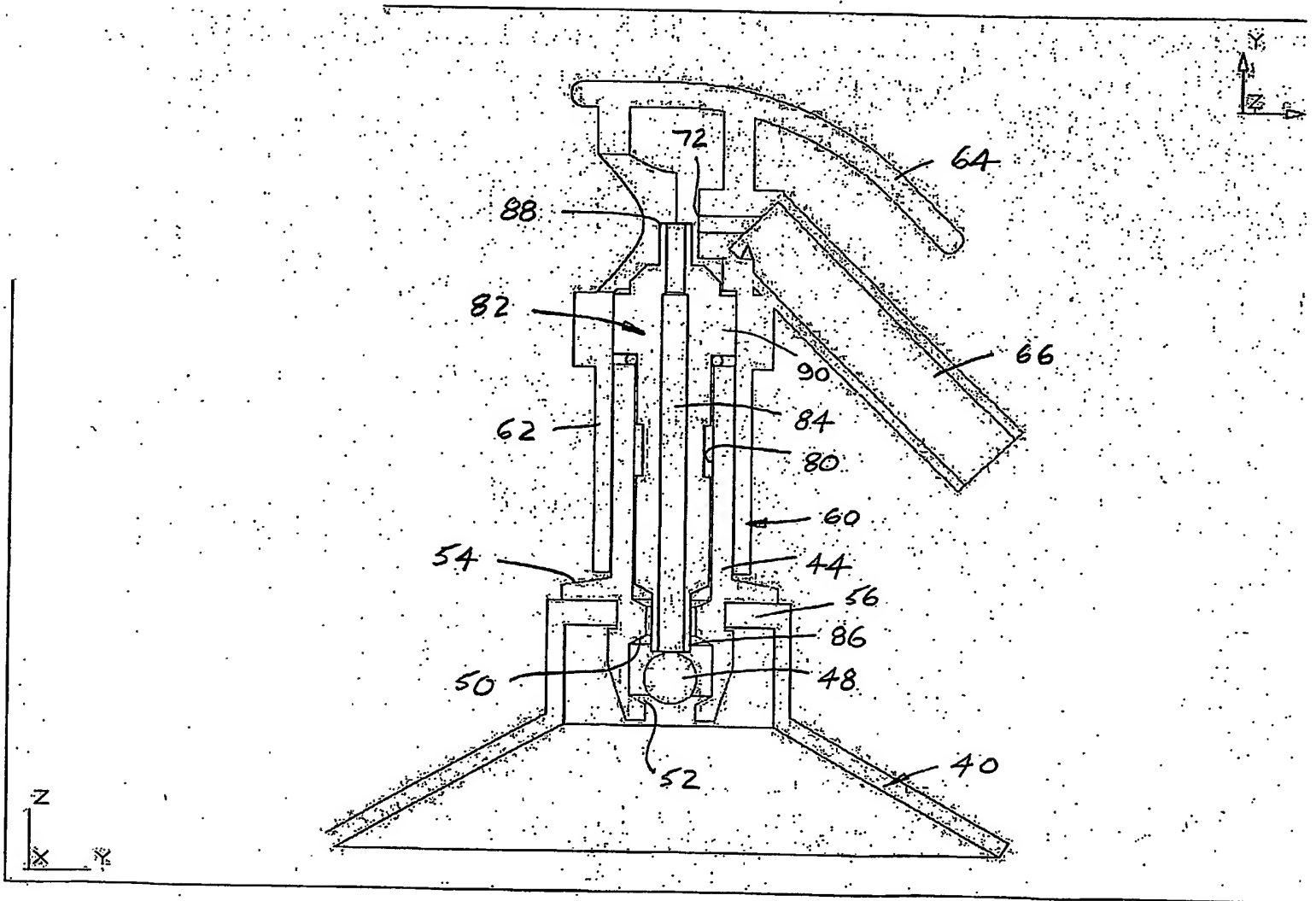
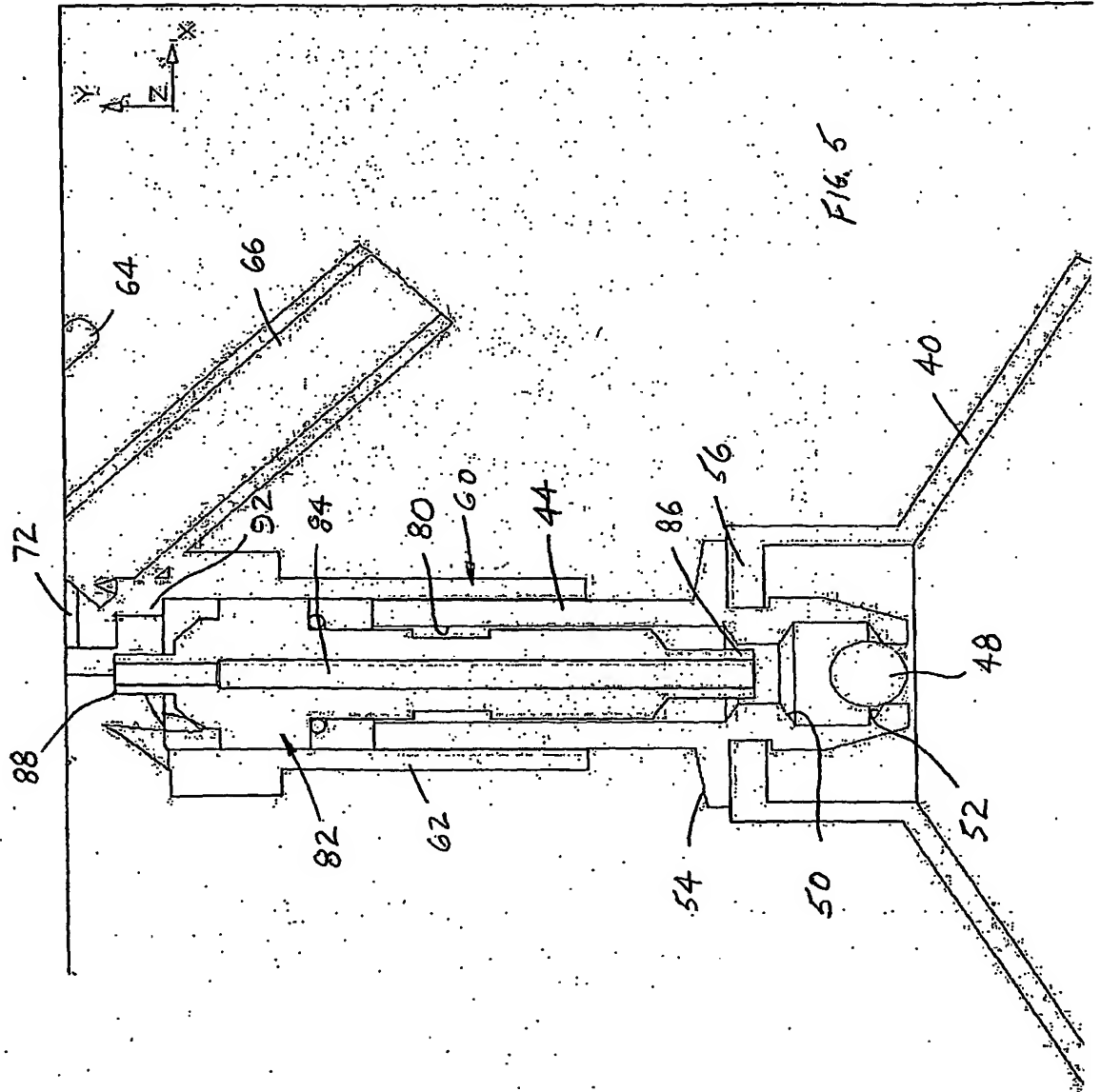


FIG. 4

BALL UP SPRAYING



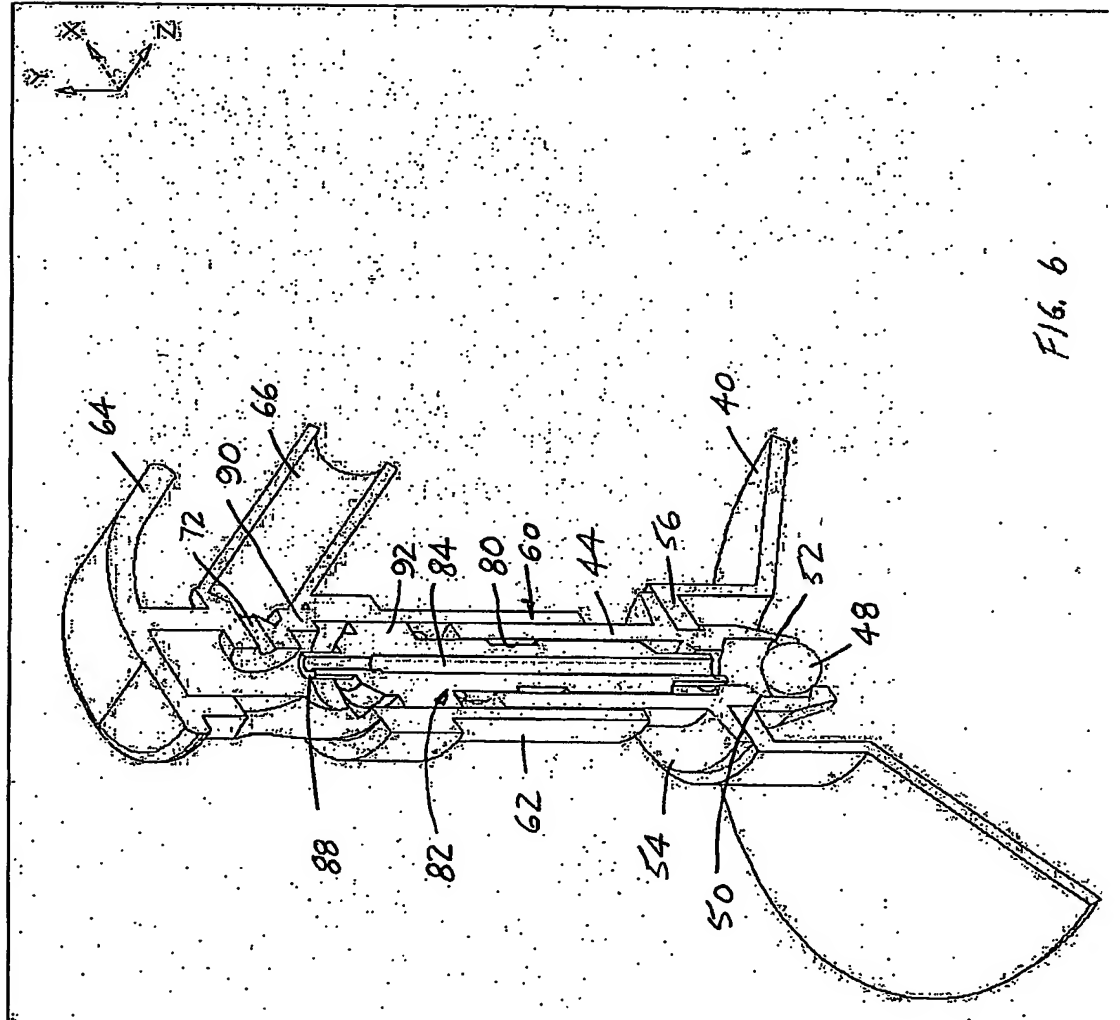
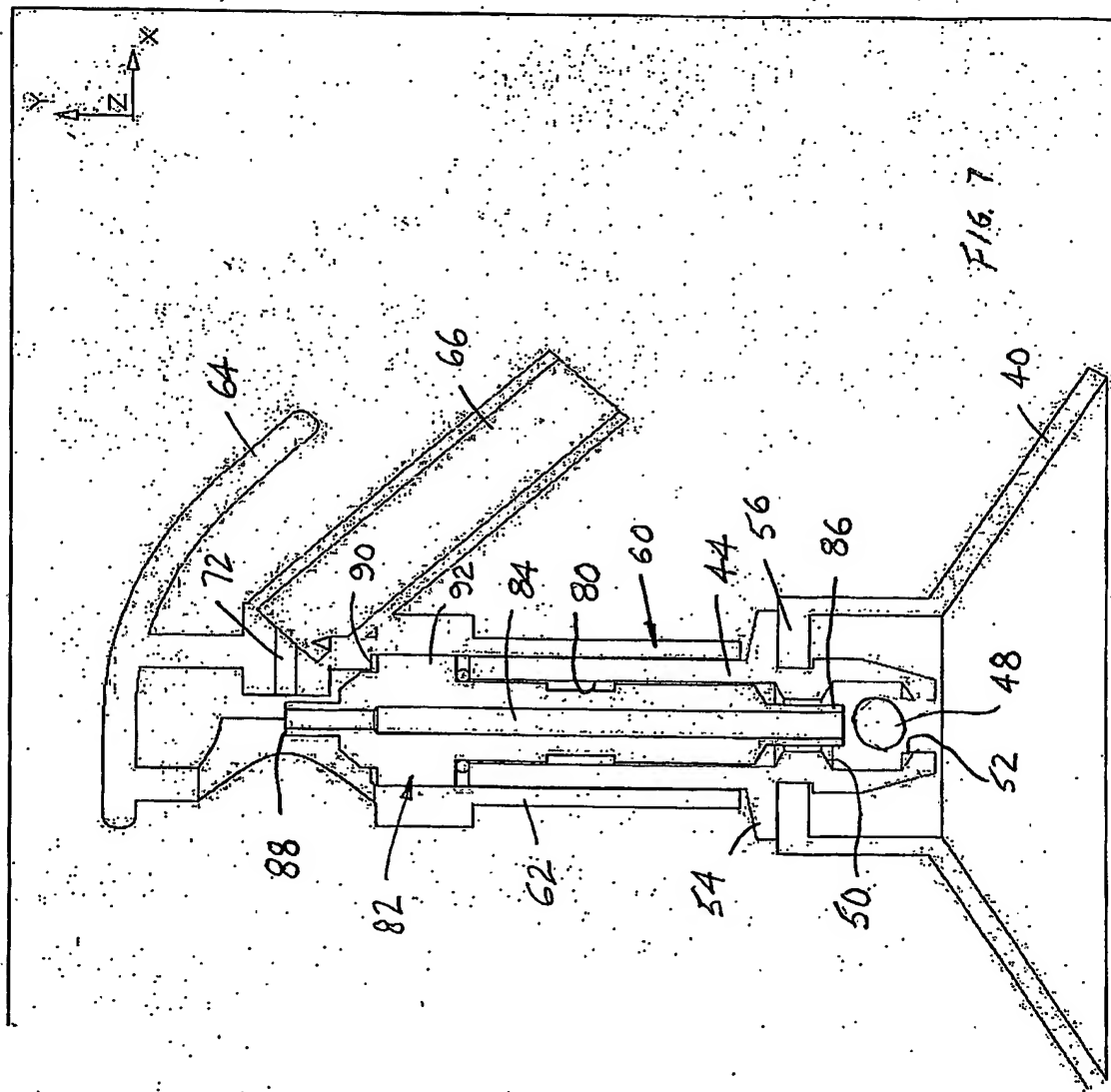


FIG. 6

## SPRAYER FULL DOWN!



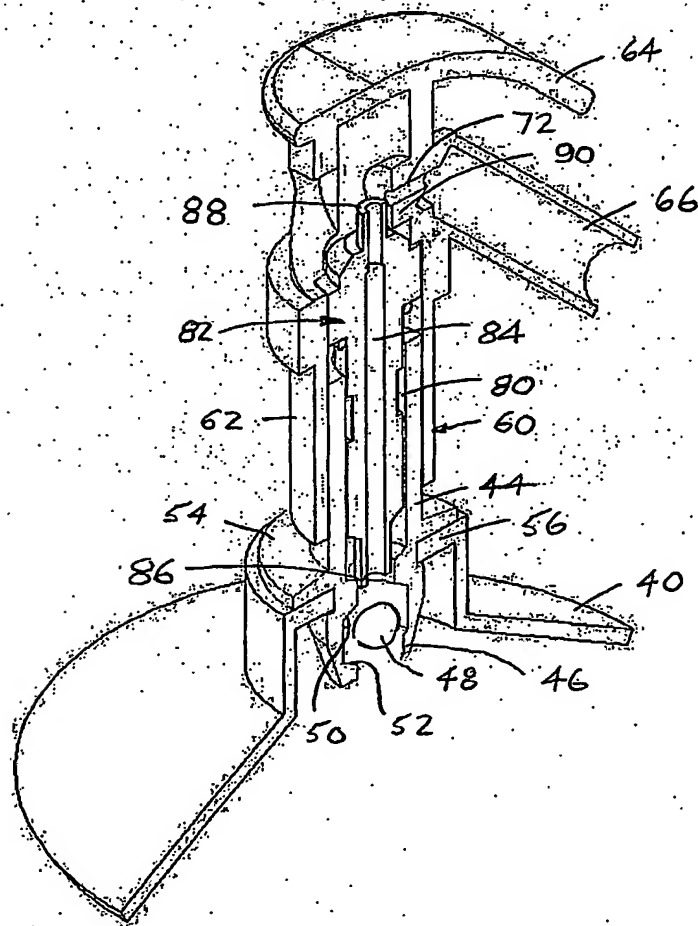
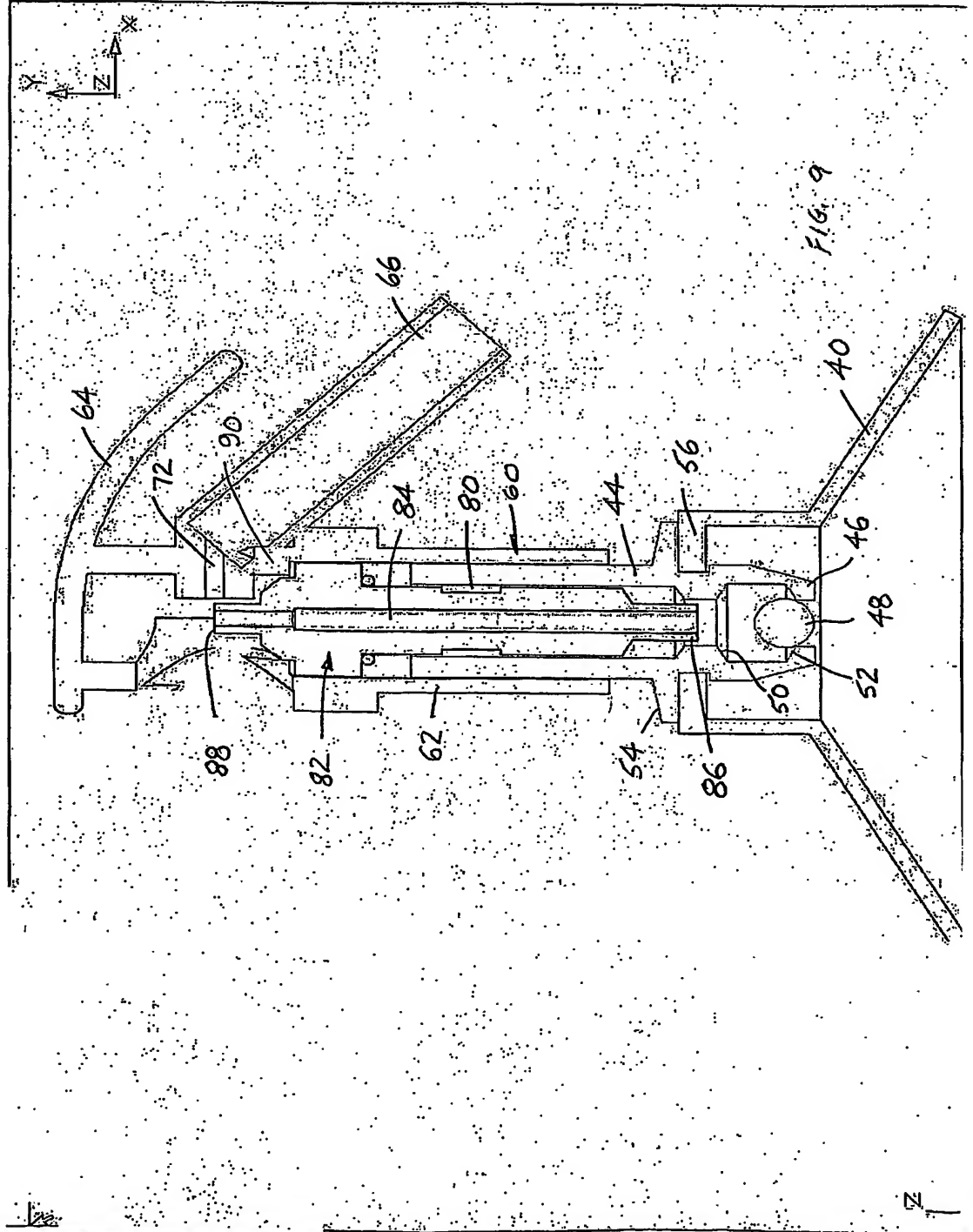


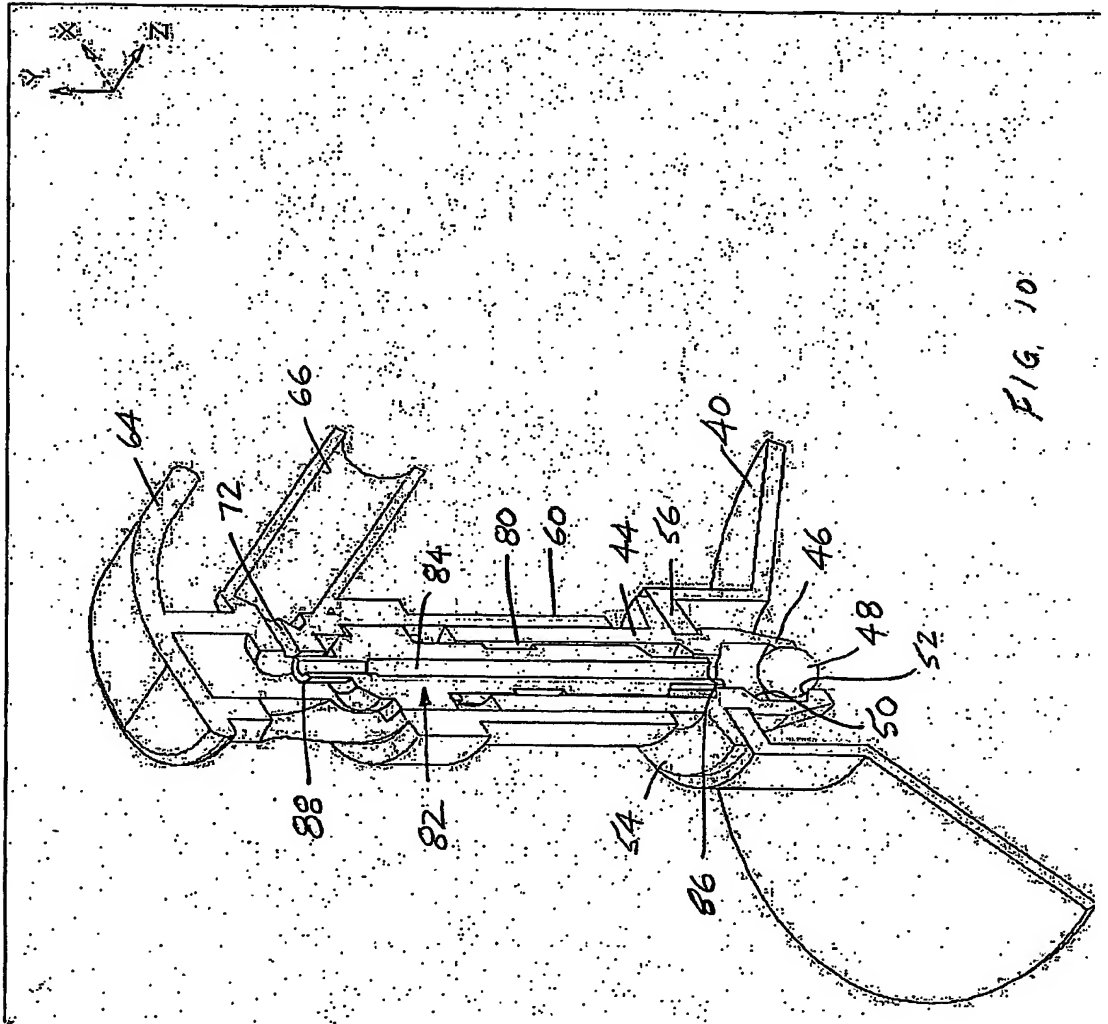
FIG 8

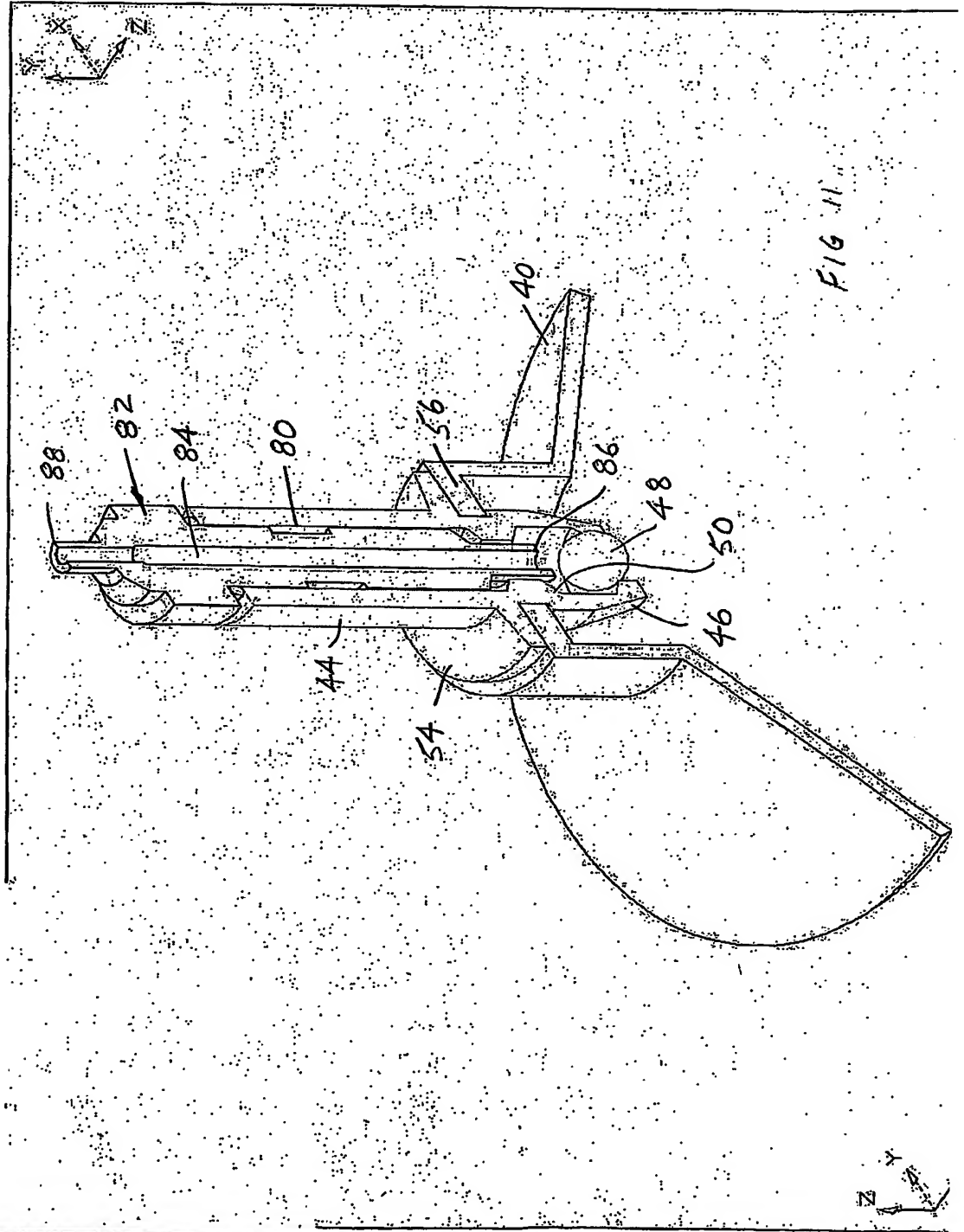
SPRAYER FULL POWER

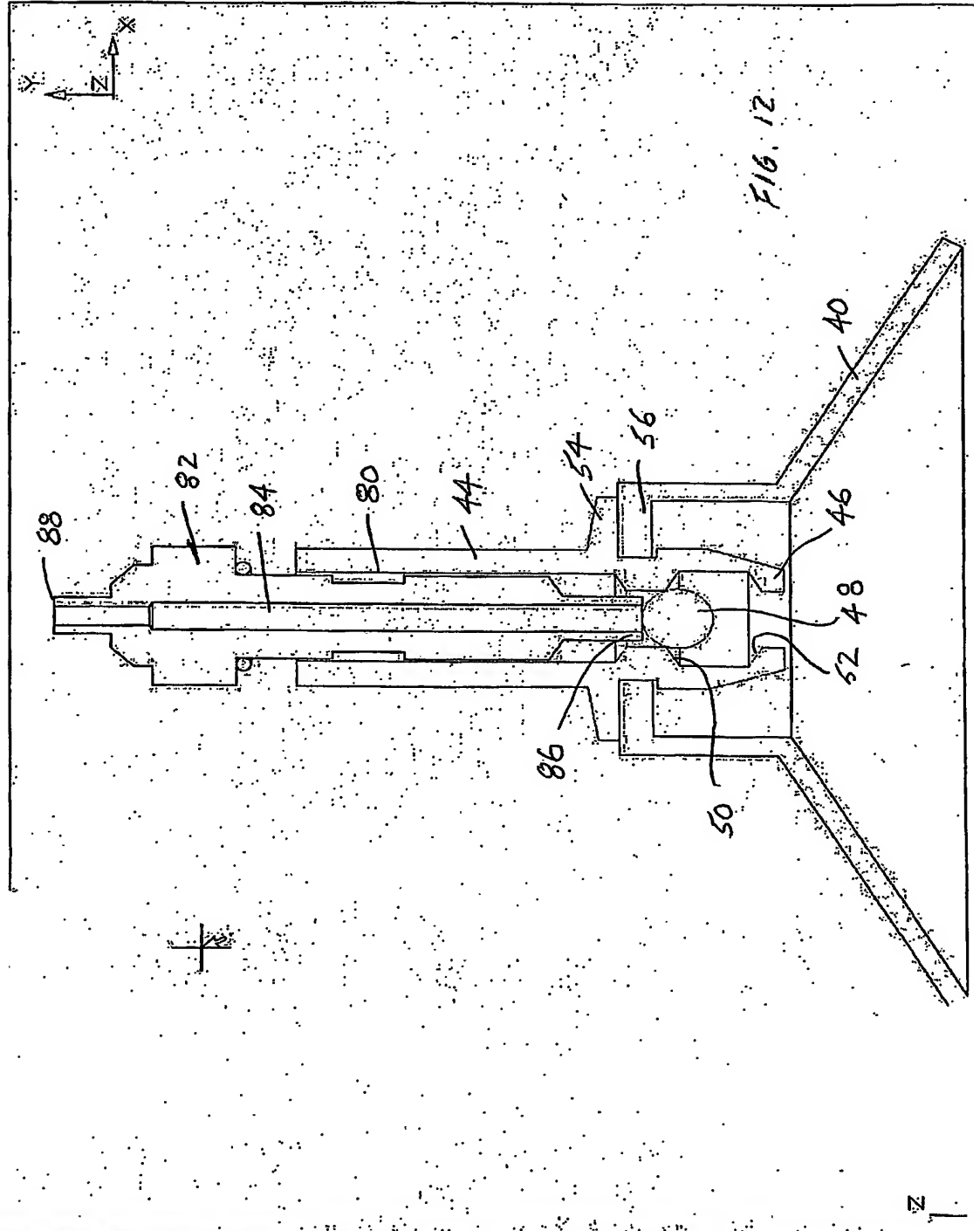


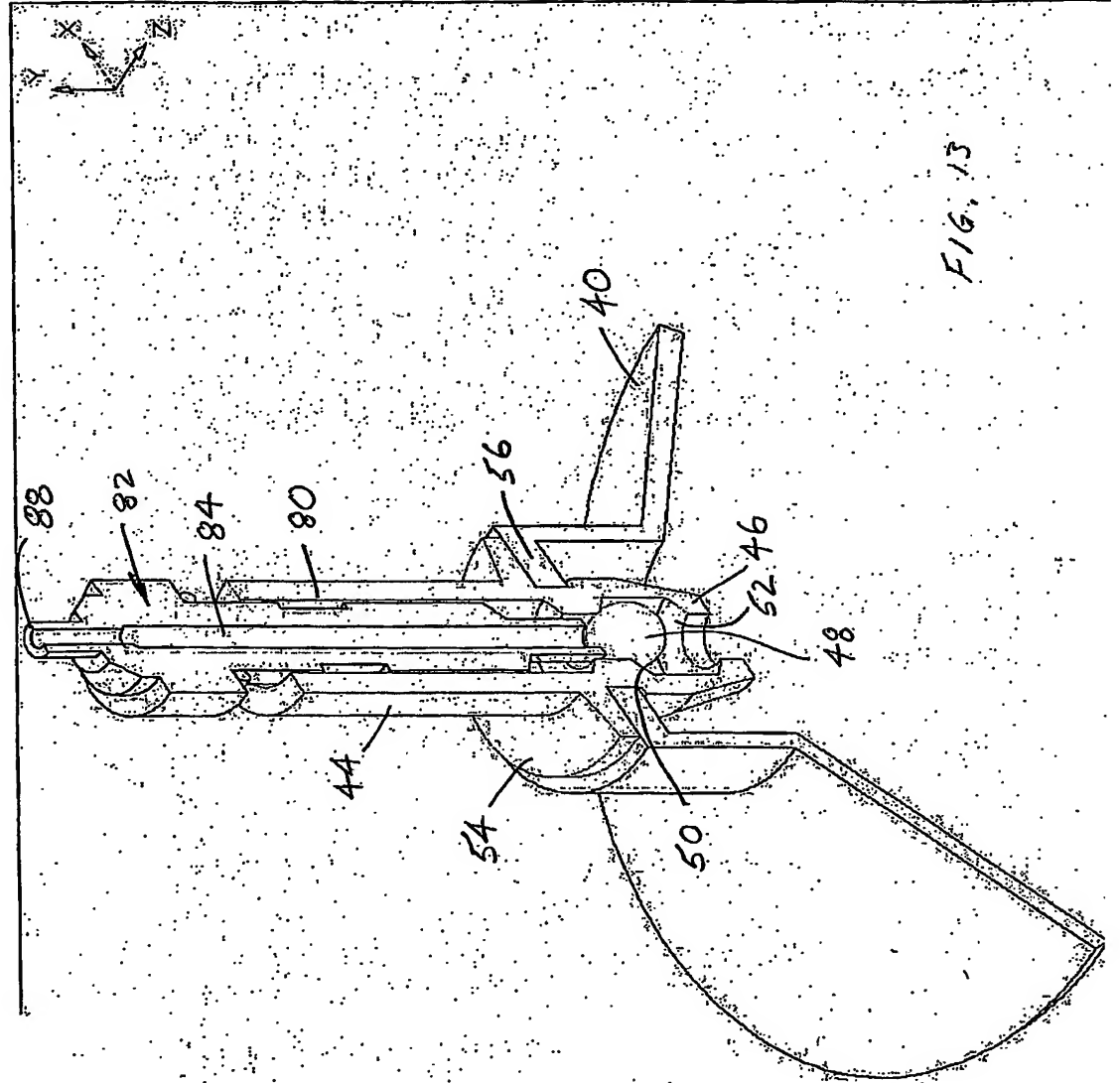


SPRAYER SUCKING PAINT









**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ BLACK BORDERS
- ☒ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☒ SKEWED/SLANTED IMAGES
- ☒ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☒ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**